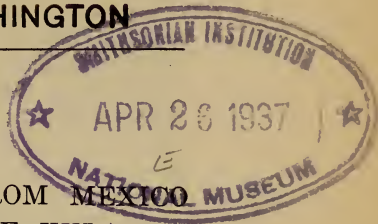


PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



NEW SPECIES OF HYLID FROGS FROM MEXICO
WITH COMMENTS ON THE RARE *HYLA*
BISTINCTA COPE.

BY EDWARD H. TAYLOR.

In the collections made by Dr. Hobart Smith and myself in Mexico, I find three forms of the genus *Hyla* which appear to be new. The descriptions follow:

Hyla robertmertensi, sp. nov.

Plate II, figs. 3-7.

Holotype.—No. 2270, E. H. T.—H. M. S. Coll., collected near Tapachula, Chiapas, August 24, 1935, by E. H. Taylor and Hobart M. Smith. Taken at night clinging to plants surrounded by water.

Paratypes.—Nos. 2269, 2271, near Tapachula, Chiapas, August 24, 1935; nos. 2272-2280, near Tonolá, Chiapas, Aug. 27, 1935; 2281-2287, 2289, 2290, near Asuncion, Chiapas, Sept. 1, 1935, all collected by E. H. Taylor and Hobart M. Smith.

Diagnosis.—A very small hyla, maximum size about 30 millimeters; the snout not depressed; rounded canthi which, when projected, form an angle less than a right angle where they meet anteriorly; eye about as long as the distance between eye and tip of snout (measured on median line); interorbital width about once and one half the width of the upper eyelid; tympanum apparently covered with skin, but very distinct, its diameter about half the length of eye; digits with well developed terminal digital disks; the fingers about one fourth webbed; the subarticular tubercle of outer finger double; toes about three fourths webbed, the web reaching the base of the terminal disks on at least the outer side; the tibiotarsal articulation reaches middle of eye; above, lavender to pinkish-vinaceous; in males the dark pigment tending to form longitudinal lines; no pigmentation on thighs, save a scattering of minute flecks at knee; a brownish lateral stripe.

Description of holotype.—Adult female. Anterior profile of head somewhat acuminate, the snout at nostrils as deep as head in interorbital region; the canthi form an angle less than a right angle on the point of the snout; lores

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sloping, not concave; eye moderately prominent, about equal to the length of the snout (from a line drawn in front of eyes to tip on median line); the distance from eye to nostril about equal to distance between nostrils; vomerine teeth in two rather large, slightly diagonal groups, closely approximated, lying directly between the choanae; choanae moderately large, not concealed by overhanging jaw, separated from each other by a distance greater than that between nostrils; tongue large, rounded, not emarginate behind; not, or but slightly, free behind; tympanum distinct, covered with thin pigmented skin, its diameter about one half the length of eye; skin on body and limbs smooth, save the surface of the abdomen, which is covered with large granules, and the medial part of the thighs in which the granules are somewhat less pronounced; a more or less distinct fold on breast.

Fingers about one fourth webbed, the tips dilated strongly, the disks nearly the size of the tympanum; first finger smaller than second; a slight dermal margin to disks evident; a large flat palmar tubercle at base of first finger, and two small outer tubercles; subarticular tubercles large, salient, the distal tubercle of outer finger distinctly double; foot about three fourths webbed, the webbing reaching inner side of disk of fifth toe, to the distal subarticular tubercle of the fourth toe, and the inner side of the disks of the three inner toes; a large flat inner metatarsal tubercle; a small indistinct outer (sometimes not or scarcely visible). When limbs are folded at right angles to the body the heels overlap about two millimeters; tibiotarsal articulation reaches to near middle of eye; the tarsal fold not or scarcely indicated (often distinct in males).

Color in life.—Above on head and body the general color is pinkish lavender, slightly stronger anteriorly and bordered by a narrow silvery line from tip of snout along canthi and dorsolateral regions to groin; upper surface of tibia and distal part of arm a lighter pinkish-lavender becoming nearly yellowish on feet; the entire thigh is yellowish flesh save a few minute flecks of pigment at knee; sides with a brownish stripe, darkest where it joins the silvery line, and tending to narrow and disappear along the posterior part of body.

Variation.—The series shows very constant characters. The males, however, are smaller and more slender than females and possibly have a slight difference in the amount of webbing on the feet. The figures show variation in markings.

Remarks.—The species was found breeding in pools in cleared areas, together with *Hyla staufferi*, and a small *Hypopachus*. In habits and voice they are much like *Hylella picta*. They appear to be related to *Hyla phlebodes* and *Hyla underwoodi*.

The species is named for the noted European herpetologist, Dr. Robert Mertens of the Senckengerian Museum, Frankfurt am Main, Germany.

MEASUREMENTS OF *Hyla robertmertensi*, sp. nov.

Number.....	2270	2276	2271	2213	2282	2278	2281	2286	2287
Sex.....	♀	♀	♂	♂	♂	♂	♂	♂	♂
Snout to vent.....	29	27.1	26.6	26.5	25.5	25.5	24	24.8	23.5
Head width.....	9.2	8.6	8.2	8	8	8	7.5	7.6	7.4
Head length.....	9.1	8	8	7.8	7.6	7.8	7.2	7	7.1
Tympanum.....	1.6	1.5	1.3	1.3	1.2	1.1	1.1	1	1
Diameter of eye.....	3	2.8	2.9	3	2.8	2.8	2.7	2.5	2.5
Eye to snout tip.....	3	2.9	3	2.9	2.8	3	2.9	2.7	2.8
Interorbital width.....	2.7	2.7	2.5	2.3	2.2	2.2	2.4	2.1	2.2
Eyelid.....	2	2	2.2	2.2	2.1	2.2	2.1	2	1.8
Foreleg.....	15.2	14.2	13	14.2	12.6	12.8	13.2	12.2	13.2
Hind leg from vent.....	43	40.2	39	38	37	38.2	39	37	35
Tibia.....	14.5	13	13.5	12.8	12	12.5	12	12.2	11.2
Foot.....	20.6	18.3	18	18	16.8	17.8	16.3	16.3	15.8

Hyla pinorum, sp. nov.

Plate II, fig. 2.

Type.—No. 5972. Collected in pines on Mexico-Acapulco highway between kilometers 350 and 351, near a spring known as Agua del Obispo, between the towns of Rincon and Cajones, July 25, 1936; E. H. Taylor, collector.

Diagnosis.—A small hyla, with vomerine teeth equally spaced between very large choanae, which are at least three times the area of a single group of teeth; tongue cordiform deeply emarginate behind; snout not projecting beyond mouth; nostrils separated by a distance very slightly less than narrowest distance between upper eyelids; canthus rostralis moderately angular; tympanum completely concealed beneath skin; a well-defined supratympanic fold; if limbs are folded, heels overlapping one or two millimeters; tibiotarsal articulation reaching beyond the tip of the snout; no fold on breast; hand about one-fourth webbed, the width of the pads on the two outer fingers contained in eye diameter twice; distal subarticular tubercle on fourth finger double; a strong continuous fold on outer ventral edge of arm; toes two-thirds to three-fourths webbed; outer metatarsal tubercle wanting or very inconspicuous; skin above minutely corrugated; abdomen and under thighs strongly granular; chin, throat and breast indistinctly granulate.

Description of the type.—Head above slightly broader than long, the eyes prominent, in dorsal view extending beyond profile of jaw; the upper eyelid only slightly (about one-seventh) less than distance between the eyelids; the longitudinal diameter of the eye equal to the length of the snout from a line drawn between anterior edges of eye; snout almost as deep at nostrils as at eye; in lateral profile the snout very truncate almost vertical from lip; nostrils at extreme upper edge; area about nostrils somewhat raised with a noticeable depression between them; canthi obtusely angulate, the lores sloping rather abruptly some distance below canthus, then sloping more gently to lip, leaving loreal region slightly concave; profile of jaw from ventral view nearly circular.

Tongue definitely cordiform, the posterior emargination rather deep, curving rather than angulate; vomerine teeth in two small transverse groups, their distance from the very large choanae about that of distance between the two groups; choanae completely visible from ventral view; no trace of a tympanum; the supratympanic fold distinct, terminating above arm; no glandular thickening or folds at or near jaw angle.

Web between the first two fingers very narrow; that between the second and third more extensive, while that between the outer finger still larger is equivalent to between one-fourth and one-third of the total area; the webbing extended along edge of fingers as a narrow fold; digital pad of the first finger scarcely wider than digit; those of other digits larger, subequal, about as wide as half the length of eye; distal subarticular tubercle of fourth finger double, that of third irregular, partially divided, of other fingers, single, rounded; proximal tubercles of two outer fingers small; fingers flattened with numerous, irregular supernumerary tubercles or

granules on ventral surfaces of fingers and on palm; an elongate tubercle on base of first finger and a large outer palmar tubercle; a skin fold on outer edge of fourth finger, continuous with a strong fold on outer ventral surface of arm.

Feet about three-fourths webbed, the terminal pads smaller than those on fingers; subarticular tubercles rather small, those at base of disks rather prominent; the granular, supernumerary tubercles less prominent than those on hands; an oval inner metatarsal tubercle, the outer metatarsal tubercle wanting; a sharp-edged tarsal fold present, curving somewhat at its proximal end; a few small pustules on heel; skin on dorsal surface of body and hind limbs finely corrugated; on arms the corrugations are coarser; on chin, throat and breast the granulation low, rather indistinct; on abdomen, and over the greater part of the ventral surface of femur and region below anus the granulations are coarse, the granules irregular in size; posterior surface of femur smooth for the most part.

Color in life.—Above generally brownish with some ten or eleven large scattered spots of dark brown ringed about with blackish dots; numerous smaller spots on head; a fine black dorsal median line beginning on the interorbital region and extending nearly the length of the body; loreal and tympanic regions somewhat grayish with numerous black flecks or short irregular lines; an irregular narrow silver line on upper lip extending to angle of jaw; three prominent brown bars on forearm, two or three less distinct across hand and one on upper arm. On sides, grayish brown with black dots, these a little larger and irregular along edges of abdomen; on femur a narrow grayish brown stripe edged with darker brown, broken by very short transverse bars, four on each femur; the anterior femoral face lightly stippled with brown, the posterior face densely and evenly stippled with darker brown; a silvery gray, black-edged, irregular line above anus; the glandular pustules below anus silver-white; tibia with four well-defined transverse bars, bending onto the anterior face of tibia; bars on foot and toes less distinct; under surfaces of foot and hand stippled with brown; ventral surface of abdomen and limbs dirty whitish; chin and throat cream white, with a few black dots on edge of lower jaw; fold on forearm white, black edged. A dim whitish line on outer toe, continued to, and across heel; iris of eye golden with a minute stippling of black; a stippling of black pigment on roof of mouth anterior to the choanae.

Measurements (in mm.).—Snout to vent, 27.6; width of head at jaw angle, 11.2; upper eyelid, 2.5; interorbital width, 2.9; length of eye, 3.4; eye to nostril, 2.8; snout to line drawn between angle of jaws, 10.5; arm to tip of third finger, 19.2; hind leg (anus to tip of fourth toe), 47.7; tibia, 16; foot 20.

Relationship.—This small species offers little clue to its relationships with other Hylas. The concealment of the tympanum might suggest a relationship with other forms lacking a visible tympanum, but in itself I doubt that this shows its true relationship. I strongly suspect that the relationship is with the group including *underwoodi*, *robertmertensi*, and perhaps *phlebodes* and *leonhard-schultzi*, forms characterized by the double

sub-articular tubercle on the outer finger. However, the mode of pigmentation of the femur and coloration fail to confirm this association.

Remarks.—The holotype was collected at night in a tiny rain pool during a downpour. When discovered, it was almost wholly hidden by a piece of wood and immediately concealed itself under it. No other specimens of the species were found.

***Hyla erythromma*, sp. nov.**

Plate II, fig. 1.

Holotype.—No. 5976; collected in pines along Mexico-Acapulco highway at km. 350, near a spring known as Agua del Obispo, between Rincon and Cajones, July 23, 1936; E. H. Taylor, collector.

Diagnosis.—Head not or scarcely wider than the body; vomerine teeth in two transverse groups, which are closer to each other than to the choanae, and not, or scarcely reaching a line drawn between the anterior edges of the choanae; tongue somewhat cordiform, emarginate posteriorly; snout rather obtusely pointed, not, or extending but slightly, beyond mouth; eye large and prominent, its length equal to the length of snout, canthus rostralis distinct; nostrils separated by a distance a little less than that between upper eyelids; width of upper eyelid about a fifth less than distance between upper eyelids; tympanum moderately distinct, the diameter contained in length of eye two and one half times; a well-defined straight supratympanic fold conceals the upper part of tympanum; if limbs are folded, the heels overlap one and one-half millimeters; the tibiotarsal articulation reaches a little behind anterior edge of eye; no skinfold on the breast; three outer fingers about one-fourth webbed; toes about one-fourth webbed; a low, more or less continuous fold on forearm; outer metatarsal tubercle moderate; a very small outer tubercle present; skin above very smooth; chin and breast with a faint suggestion of granulation; abdomen strongly granular as is part of the ventral and posterior face of the femur; lip with a narrow discontinuous white line, widening into spots below eye; sides of body with large white spots more or less confluent, bordered by irregular blackish spots; a white spot on upper arm; eye reddish.

Description of holotype.—Width of the head very slightly greater than the length measured from a line connecting angles of jaws; the eyes prominent, in dorsal view extending beyond outline of jaw; the upper eyelid only slightly narrower than the interorbital width (about one-ninth); the longitudinal diameter of eye equal to the length of the snout; snout distinctly deeper at eye than at nostril; area about nostrils not raised and no depression exists between them, their distance from the most anterior point of snout about one millimeter; the canthi projected forward would intersect above the extreme tip of snout; lores sloping, very slightly concave; tympanum moderately distinct, the upper part partially concealed by the tympanic fold.

Tongue very large, more or less cordiform, the posterior emargination shallow, but distinct; groups of vomerine teeth closely approximated, separated from choanae by half the length of one group; choanae more than

one half larger than a single group of teeth, and about three times as large as the openings of the eustachian tubes and smaller than the choanae in *Hyla pinorum*; region in front of choanae lacking pigment.

Skin above on body and limbs completely smooth; below, the chin, throat and breast show only a faint suggestion of granulation; abdomen completely granulate; ventral face of femur with granules, the greater part of which are double the size of those on the belly; disks on outer fingers about size of the tympanum; the outer subarticular tubercle of fourth finger divided; only a trace of an interdigital membrane between first and second fingers; remaining digits one-fourth webbed, the depth of the membrane 1.5 to 1.8 mm.; no well-defined fold along edge of outer toe, the skinfold on forearm only moderately distinct; pad at base of thumb moderate; two palmar tubercles, the inner more or less divided; numerous supernumerary tubercles or granules on fingers and palm; when limbs are folded at right angles to body, the heels overlap a little more than two millimeters; hind limb brought forward, the heel reaches the anterior edge of eye; toes about three-fourths webbed, the webs not reaching pads save on outer toe, the digital pads smaller than those on outer fingers; inner metatarsal tubercle moderate; outer present, but small; none or only a faint suggestion of a tarsal fold.

Color in life.—Above somewhat purplish olive with a few indistinct dark flecks or spots, the spot on snout rather large and prominent; lores without a black bar, the lip edged with a silver line which extends to angle of jaw, widening irregularly to form a light spot below eye; a few darker spots or reticulations border this; a series of white areas more or less contiguous, are bordered by black on the sides from axilla to groin, and a similar spot runs along proximal dorsal part of arm; the femur is clouded grayish and brownish above; the anterior and posterior faces are uniformly pigmented with brown; tibia, fibula with dimly evident bars; a rather indistinct line on outer edge of foot to heel; and one on hand extending to elbow; a whitish line above anus, and a larger one below; no unpigmented areas on hands or feet; below nearly paper white with three or four tiny black dots on jaw.

Measurements (in mm.).—Snout to vent, 28.4; head width, 10.2; head length to angle of jaw, 9.8; length of eye, 3.3; length of snout, 3.7; inter-orbital width, 3.1, upper eyelid, 2.85; eye to nostril, 2.9; distance between nostrils, 3; arm, 15; leg from anus, 43.1; tibia, 14.2; foot, 18.5; tympanum, 1.3.

Remarks.—This small species was collected in pine country under a fallen pine log in the afternoon. This type of habitat is doubtless a very unusual one as search for several days in this region revealed no further specimens under the very large number of logs examined. The specimen is female, apparently young.

Relationships.—On first examination this species suggests *Hyla taeniopus*, from which species it differs in having a head no wider than the body; the snout not projecting beyond lip; absence of well-defined bars on limbs; snout longer than eye, lesser amount of webbing on foot (since web does not reach disk of third finger); tarsal fold not present, and concealed parts of limbs pigmented.

It shows certain characters in common with young *Hyla bistincta* but differs in numerous points. It differs in a smaller eye in proportion to the snout length, a smoother skin, a larger tympanum, a more flattened head, lack of spotting on the anterior and posterior faces of femur, in a somewhat greater extent of webbing between toes and fingers, the lesser development of the thumb pad and a different eye color. Whether horny areas are present in the male can not be determined now. Numerous other differences are obvious on a comparison of descriptions, especially the absence of the curious anal flap present in *H. bistincta*.

Hyla bistincta Cope.

Plate III, figs. 1 and 2.

This species, long known from a single type specimen, was rediscovered and a small series taken. These have been compared with the type and agree with it in essential details. The curious anal flap (perhaps somewhat distorted in the type), and the horny spinules on the second finger are present in the type. Two other specimens, which I identify as this species (U. S. N. M. Nos. 38266-38267 from Cordova, Mexico), likewise agree in having the elongate anal flap. The exact type locality is unknown, but the recognition of specimens from Cordova lends weight to Kellogg's suggestion that the type locality is "most probably" Vera Cruz (State).¹

The following specimens were taken:

Nos. 5888-5895 collected about 2 miles directly north of Cuernavaca, Morelos, Mexico, July 12, 1936, at night, H. M. Smith and E. H. Taylor, collectors; and Nos. 5886, July 18, 1936, and 5887 Aug. 6, 1936, Uruapan, Michoacán, Mexico, H. M. Smith, and 5896 between Cuernavaca and Mexico City, near Tres Cumbres (Tres Marias) at km. 63, elev. 9,000 ft. by E. H. Taylor Aug 4, 1936 (killed in road by auto).

Diagnosis.—A medium-sized hyla; head not wider than body; vomerine teeth in two closely approximated groups, a single group nearly once and a half the size of choanae, slightly converging; tongue subcircular, emarginate behind; snout projecting slightly; eye large, its length one fifth or one fourth longer than snout; upper eyelid about equal to or slightly greater than the interorbital distance; canthus rostralis distinct, more or less angular; tympanum oval, its width contained in eye length 3 to 3½ times, its height about 2½ times; a much thickened supratympanic fold; a very rudimentary web between fingers; digital pads of three outer fingers very much larger than tympanum; tibiotarsal articulation reaches to middle of eye; toes about three fourths webbed in males, less in females; above gray or brownish, without bars on limbs; a black reticulation on sides enclosing rounded white spots from axilla to groin, continues on anterior face of femur; posterior femoral face similarly colored; skin smooth or minutely corrugated above; below pustular granules on chin, throat and breast; abdomen densely granulate; anus covered by a flap, which throws opening nearly on a level with the ventral surface of the femur; first finger very greatly thickened at base, with a concealed pollex bone 3½ mm. long; a heavy,

¹ Kellogg, Bull. U. S. N. M. No. 160, 1930, p. 163.

horny deposit over the inner and dorsal face of first finger, extending to pad; inner surface of second finger likewise covered, sometimes a small patch on third.

Description of species (from No. 5888).—Head wide, distinctly wider than long, but narrower than body; canthi converging if projected, and intersecting posterior to tip of snout; region about nostrils not raised, area between them flat; anterior profile of snout semicircular, seen from side, projecting somewhat beyond the mouth; loreal region sloping obliquely, somewhat concave; upper eyelid slightly wider than the interorbital distance, nearly equal to distance of eye to nostril, and likewise equal to depth of snout at nostril; eye large, projecting; tympanum oval, its diameter (on longitudinal axis) contained in eye length more than three times; distance from eye one and a half its width; a thick glandular fold from eye to arm, curving slightly and concealing upper part of tympanum.

Vomerine teeth in two large, closely approximated groups, each much larger than the relatively small choanae, and converging slightly; they lie between choanae, reaching their upper borders and extending behind to posterior borders of choanae; openings to the vocal sacs posterior, near the inferior angle of the mouth; tongue subcircular, distinctly notched behind.

Arms heavy, the three outer digits with large terminal pads, the largest much greater than the tympanum, its width contained in the length of eye two times; web between fingers rudimentary, the greatest depth of the web between fingers a little less than one millimeter; distal subarticular tubercles large, single; proximal tubercles small; supernumerary tubercles in lines, indistinct; dermal flaps on sides of fingers barely indicated; first finger enormously thickened at base, the thickening covered by a deep brown, horny, spiny excrescence covering part of ventral surface, the inner and most of the dorsal surface of swelling and finger and extending to pad; a similar elongate patch of horny excrescences on inner edge of second finger, and a trace of a patch on third near pad; the swelling contains a bone, representing the pollex that is $3\frac{1}{2}$ mm. in length; no fold on arm; feet about two-thirds to three-fourths webbed, the membrane failing to reach the pads save as a narrow fringe; a flat, oval inner metatarsal tubercle, the outer apparently wanting; distal subarticular tubercles large; proximal tubercles very small, rather indistinct; supernumerary tubercles very indistinct; a rather indistinct tarsal fold, showing an edge broken by rather flat pustules; a narrow fringe on outer edge of fifth toe; the tibio-tarsal articulation reaches to middle of eye; when limbs are folded at right angles to body the heels barely overlap; a flap of skin, apparently with two lateral glandular areas, carries the anal opening some distance ventrad.

Skin generally smooth, save for very fine, rather indistinct corrugations below chin, throat and breast, with scattered pustules; surface of abdomen and ventral surface of femur granular.

Color in life.—Reddish brown above on all exposed surfaces; sides of head more reddish bronze, with a deeper brown stripe from nostril to eye and a dark brown mark following the supratympanic fold; lip very indistinctly lighter than lores; sides reticulated with black brown, inclosing canary-yellow spots; upper anterior face of femur and posterior face blackish

TABLE OF MEASUREMENTS IN MM.—*Hyla bistincta* Cope.

Number.....	5886	5888	5890	5893	5889	5887	5892	5894	5891	5895
Sex.....	♀	♂	♂	♂	♂	♀	♂	♂	♂	♂
Snout to vent.....	31	51	48.5	48	48	52	46	46	45	43
Snout.....	3.5	4.2	4.5	4.6	4.5	5.1	4.2	4.5	4.3	4.1
Head width.....	11.1	18.5	16.7	17.6	17.5	17.8	16	16	16	15.6
Head length (snout to jaw angle)	10	14.5	15.5	14.1	14.1	14.8	13.5	12.8	13.5	12.8
Diameter of eye.....	4	5.7	5.3	5.5	5.5	5.8	5.3	5.1	5.3	5
Tympanic width.....	1	1.8	2	2	2	2.1	1.8	1.8	1.6	2
Tympanic height.....	1.3	2.6	2.8	2.7	2.6	2.1	2.1	2	2.1	2.2
Eye to nostrils.....	3	4.1	4.1	4	3.8	4.1	3.8	4	3.6	3.8
Between nostrils.....	3.2	3.5	3.3	3.3	3.3	4.1	3.3	3	3.3	3
Upper eyelid, width.....	3.3	4.7	4.3	4.9	4.7	4.7	4.3	4	4	4
Interorbital distance.....	3.3	4.2	4.5	4.8	4.2	5.1	5	4	4.5	4
Arm.....	21.2	32.5	34.5	35	31.5	34.2	32	31.8	29	30
Hind leg.....	41	75	73.8	79.2	75	75	73	71	72	71
Tibia.....	15.2	25	25	25	23	25	24.2	23.3	24	23
Foot.....	21	37	36	37.6	33	35	32	31.2	32	30.2



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